



TITLE:

Efficiency of Geiger-Muller Counter

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ABSTRACTS

mg/cm² which is used for the high energy beta-ray above 200-kev. The sources used had a surface density of 50~100 μ g/cm² thickness.

The measured beta-groups are investigated by the Fermi analysis. The correction factors of the first and second forbidden and also of the mixed interactions are studied for the highest energy beta-groups from these elements.

For the decay of Ag¹¹⁰, three soft beta-groups of allowed shape with end points of 80, 314, and 530 kev are found, whose ratio of intensity is 10.7 : 3.2 : 15.3. For Sb¹²⁴, five beta-groups with end points of 2.39, 1.68, 1.07, 0.63, and 0.28 Mev are found, in which the beta-groups of the highest energy is the first forbidden mixed interaction for (ST) or (VA) forms and the other groups are allowed shape. Their intensity is 22, 6, 4, 56, and 12 percent, respectively.

(Read at the semi-annual meeting of the Institute on 21, 1954)

Efficiency of Geiger-Muller Counter

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It will be necessary to investigate the efficiency of the Geiger-Müller counter which is used in the double coil, magnetic lens beta-ray spectrometer, because the efficiency depends on the energy of beta-rays especially when measured at the low counter pressure. The G-M counter used in the present work is the side window type whose dimension is 19 mm in inner diameter and 41 mm in length. Zapon film of about 20 μ g/cm² is used as a counter window. The source used is Cs¹³⁷ which is put on thin Zapon film of about 30 μ g/cm² and dried quickly under an infra-red lamp. The 518-kev beta-spectrum of Cs¹³⁷ has been investigated by many workers and found to be the first forbidden tensor interaction. The Fermi plot corrected with the correction factor ($p^2 + K^2$) was on a straight line, where p and K are momentum of electron and neutrino emitted from the Cs¹³⁷ nucleus.

In the present experiments, the beta-spectrum of Cs¹³⁷ has been measured as a function of counter gas pressure to investigate the differences of efficiency for each beta-energies. The low energy side of this beta-spectrum has been ascertained by a straight line of the corrected Fermi plot. The energy range of the constant efficiency has been measured as 0~140, 200, and 240 kev for the gas pressure of 21, 25, and 40 mm Hg, respectively. These beta-spectrum, measured by means of the mica window G-M counter of 2.9 mg/cm², has been found to deviate from a straight line of the corrected Fermi plot at the energy below 180 kev.

(Read at the semi-annual meeting of the Institute on June 12, 1954)